Isolation and identification of polycyclic aromatic hydrocarbon (PAH) - Tolerant microalgae from oil refinery wastewater

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Microalgae are photosynthetic organisms that play a key role in the aquatic ecosystem. Wastewater samples were collected from an oil refinery wastewater treatment pond (WWTP) in West Coast of Peninsular Malaysia. Physical and chemical characteristics of collected wastewater samples were determined in situ and laboratory analysis. 5 ml of wastewater were inoculated in flasks containing Bold's Basal Medium (BBM) supplemented with three individual PAH namely naphthalene, phenanthrene and pyrene as their sole carbon sources. Flasks without PAH were used as control. All flasks were incubated under continuous illumination of fluoresecence lamps on an orbital shaker. Growth of microalagae were exhibited after two days of incubation and were assessed by measurement of chlorophyll-a content. PAHs-tolerant microalgae were identified as *Chlorella* sp. UMACC 322, *Chlorococum* sp. UMACC 324 and *Oscillatoria* sp. UMACC 323. *Chlorella* sp. UMACC 322 and *Chlorococcum* sp. UMACC 324 were further tested for its PAHs degradation capabilities in medium containing naphthalene, phenanthrene and pyrene. Analysis of residual PAHs were done using GC-MS and showed reduction of phenanthrene and pyrene (14.25% and 61.69%) after 10 days of incubation while almost no residual naphthalene was detected. Results show isolated microalgae from oil refinery WWTP were capable of degrading two-, three- and four-ring PAHs and therefore can be used in bioremediation of tested compounds.